



## Sensors



**Small Devices. Big Impact.**

# Sensors and Thermal Energy Meters from Belimo



As the world's market leader in the development and production of actuators and control valves for HVAC systems, Belimo has started a new chapter in its company history: the addition of an innovative range of sensors to its product portfolio.

## Seamlessly integrated

Our sensors offer the highest in quality and reliability, are simple to install and are seamlessly compatible with all conventional building automation systems. The product range covers the measured variables temperature, humidity, pressure, CO<sub>2</sub> and VOC and flow in pipe, duct, outdoor and room solutions. The product line is excellently complemented by the new Thermal Energy Meters, with or without MID approval depending on the application. First-class service and support are included as a matter of course.

## Sensors

### The perfect complement to actuators and valves

Application	Sensor types	
	Pressure sensor	4
	Air quality, humidity, temperature	5
<b>Duct / Air</b>	Frost monitors	6
	Duct and immersion sensors for temperature	7
	Cable sensors for temperature	9
<b>Duct / Air / Pipe / Water</b>	Safety temperature limiter STB / Temperature monitor TW	10
	Contact sensors temperature / condensation	11
	Pressure and flow sensors	12
<b>Pipe / Water</b>	Flow sensors with glycol compensation	13
<b>Outdoor / Air</b>	Outdoor sensors humidity / temperature	14
<b>Room / Air</b>	Room sensors / Room operating units	15
	Thermal Energy Meters according to EN 1434 with MID approval	16
	Thermal Energy Meters with glycol compensation	17
<b>Thermal Energy Meter</b>	Belimo Energy Valve™ according to EN 1434 with MID approval	18
	Thermowells and compression fittings, thermowell kits	19
	Mounting flanges, adapters and pipe fitting kits	20
	Mounting accessories, parametrisation accessories	21
	Parametrisation accessories, accessories for differential pressure sensors	22
	Accessories for humidity sensors, fixing straps and thermal contact fluid, connection adapters	23
	Pipe connectors, insulation shells, T-pieces with thermowell	24
<b>Mechanical accessories</b>	Thermowells, MID accessory kits, Thermal Energy Meter accessories	25
<b>Electrical accessories</b>	Sensor module as spare part, converter for M-Bus, smartphone app	26





# Air quality, humidity, temperature

## Output signals active, passive, switch 1 x SPDT, Modbus RTU, BACnet MS/TP

For temperature measurement (average value), humidity and air quality in ducts and air handling units (AHU). The multi sensors have outputs for CO<sub>2</sub>, humidity, temperature and VOC.

Power supply DC 15...24 V / AC 24 V

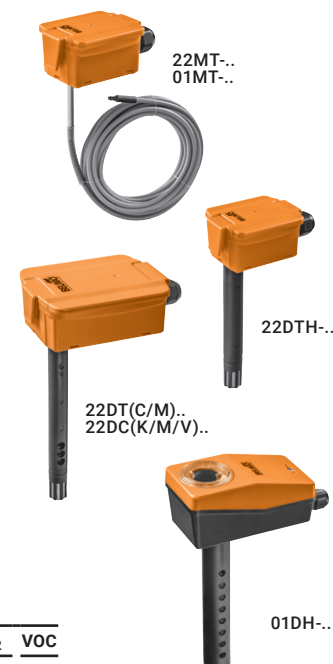
(active sensors only)

Degree of protection IP65 / NEMA 4X

IP55 (duct humidistat 01DH-..)

Housing Plastic, with snap-on cover

Communication BACnet and Modbus protocols



Measured values		Measuring ranges																									
Output signals		Temperature			Humidity			CO <sub>2</sub>	VOC	SPDT switch		Sensor type															
Multirange	Display (LCD)	Probe length	Range 15...95% RH	-50...50°C	-40...60°C	-35...70°C	-35...90°C	-20...80°C	-15...35°C	-10...120°C	0...50°C	0...100°C	0...160°C	0...250°C	Relative: 0...100% RH	Absolute: 0...50 g/m <sup>3</sup>	Absolute: 0...80 g/m <sup>3</sup>	Dew point: 0...50°C	Dew point: -20...80°C	Enthalpy: 0...85 kJ/kg	0...2000 ppm	0...5000 ppm	0...100%	SPDT switch	Sensor type		
<b>Temperature (average value)</b>																											
Passive	Pt1000	3000 mm		■																						01MT-1B4	
		6000 mm			■																						01MT-1B5
Active	DC 0...5 V / 0...10 V	6000 mm	■					□	■	■	■	■	■	■													22MT-125
		3000 mm	■					□	■	■	■	■	■	■													22MT-144
Active	4...20 mA	6000 mm	■					□	■	■	■	■	■	■													22MT-145
		3000 mm	■					□	■	■	■	■	■	■													22MT-145
<b>Humidity / Temperature</b>																											
Active	DC 0...5 V / 0...10 V	140 mm		■				□	■	■	■	■	■	■	□	■	■	■	■	■	■	■	■	■	■	■	22DTH-11M
		270 mm		■				□	■	■	■	■	■	■	□	■	■	■	■	■	■	■	■	■	■	■	22DTH-11Q
	4...20 mA	140 mm		■				□	■	■	■	■	■	■	□	■	■	■	■	■	■	■	■	■	■	■	22DTH-13M
		270 mm		■				□	■	■	■	■	■	■	□	■	■	■	■	■	■	■	■	■	■	■	22DTH-13Q
	Modbus RTU	140 mm						□							□	□	□	□	□	□	□	□	□	□	□	□	22DTH-15M
		270 mm						□							□	□	□	□	□	□	□	□	□	□	□	□	22DTH-15Q
BACnet MS/TP	140 mm						□							□	□	□	□	□	□	□	□	□	□	□	□	22DTH-16M	
<b>Humidity (duct humidistat)</b>																											
Switch		150 mm	■																						1	01DH-10N	
<b>CO<sub>2</sub></b>																											
Active	DC 0...5 V / 0...10 V																				■						22DC-11
	DC 0...5 V / 0...10 V, 4...20 mA	150 mm																			■						22DC-13
<b>CO<sub>2</sub> / Temperature</b>																											
Active	DC 0...5 V / 0...10 V										■										■						22DTC-11
	DC 0...5 V / 0...10 V, 4...20 mA	180 mm									■										■						22DTC-13
<b>CO<sub>2</sub> / Humidity / Temperature</b>																											
Active	DC 0...5 V / 0...10 V										■				■						■						22DTM-11
		180 mm									■				■						■						22DTM-1106
	Modbus RTU										□				□	□	□	□	□	□	□	□	□	□	□	□	22DTM-15
	BACnet MS/TP										□				□	□	□	□	□	□	□	□	□	□	□	□	22DTM-16
<b>CO<sub>2</sub> / VOC</b>																											
Active	DC 0...5 V / 0...10 V	150 mm																			■	■					22DCV-11
<b>CO<sub>2</sub> / VOC / Temperature</b>																											
Active	DC 0...5 V / 0...10 V	180 mm									■										■	■					22DCM-11
<b>CO<sub>2</sub> / VOC / Mix CO<sub>2</sub> / VCO / Temperature</b>																											
Active	DC 0...5 V / 0...10 V	180 mm									■										■	■					22DCK-11

□ Factory setting (setting ranges are selectable on the sensor)

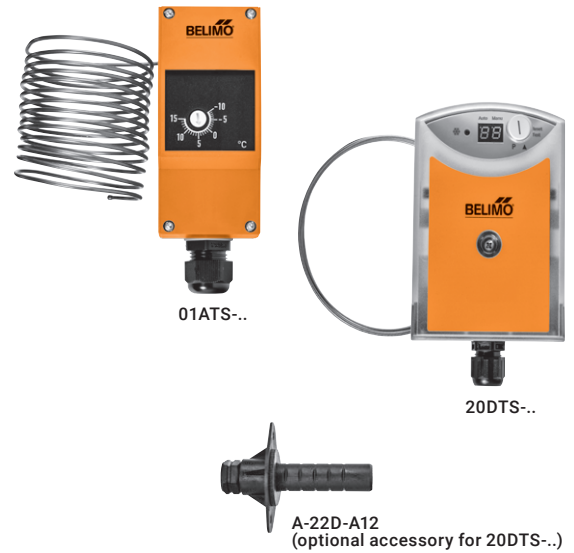
Further settings and live data can be selected and read out via Bluetooth with the accessory A-22G-A05 (22DTH-15.., 22DTH-16M, 22DC-13, 22DTC-., 22DTM-., 22DCV-11, 22DCM-11, 22DCK-11).

Scope-of-delivery and optional accessories from **page 19**

# Frost monitors

## Output signals active, switch 1 x SPDT

Reset	Manual or automatic
Capillary tube	Various lengths
Start function	With the types 20DTS-..
Switch contact	1 x SPDT
Power supply	AC 24 V (types 20DTS-...)
Signal voltage	DC 0...10 V (types 20DTS-...)



Measured values

Output signals

		Automatic reset	Manual reset	LED display, red	Capillary tube length	Range -10...15°C	Range 1...10°C	Modulating valve control DC 0...10 V	SPDT switch	Sensor type
<b>Temperature (frost protection)</b>										
<b>Switch</b>		■			3 m	■			1	01ATS-1040B
		■			6 m	■		01ATS-1050B		
			■		3 m	■		01ATS-104XC		
			■		6 m	■		01ATS-105XC		
<b>Active</b>	DC 0...10 V	■	■	■	2 m		■		1	20DTS-1P3
		■	■	■	6 m		■	■		20DTS-1P5

# Duct and immersion sensors temperature

## Output signal passive

01PT-..	For pipe installations with short response time, requires no additional thermowell.
01DT-.., 22DT-..	When used as an immersion sensor for pipe installations (liquid lines), a thermowell is recommended as an optional accessory.
Degree of protection	IP65 / NEMA 4X
Housing	Plastic, with snap-on cover



01DT-..



01PT-..

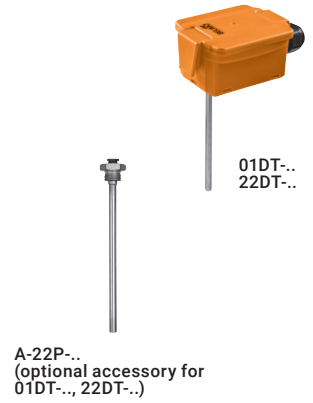
A-22P-..  
(optional accessory for  
01DT-.., 22DT-..)

Measured values		Measuring ranges			
Output signals		Temperature			
		Probe length	-50...150 °C	-50...160 °C	Sensor type
<b>Temperature (pipe)</b>					
Passive	Pt1000	50 mm		■	01PT-1BH
	Ni1000TK5000			■	01PT-1DH
	NTC10k (10k2)		■		01PT-1LH
	Pt1000	100 mm		■	01PT-1BL
	Ni1000TK5000			■	01PT-1DL
	NTC10k (10k2)		■		01PT-1LL
	Pt1000	200 mm		■	01PT-1BP
	Ni1000TK5000			■	01PT-1DP
NTC10k (10k2)	■			01PT-1LP	
<b>Temperature (duct, pipe)</b>					
Passive	Pt100	50 mm		■	01DT-1AH
	Pt1000			■	01DT-1BH
	Ni1000			■	01DT-1CH
	Ni1000TK5000			■	01DT-1DH
	NTC10k (10k2)		■		01DT-1LH
	NTC20k		■		01DT-1QH
	Pt100	100 mm		■	01DT-1AL
	Pt1000			■	01DT-1BL
	Ni1000			■	01DT-1CL
	Ni1000TK5000			■	01DT-1DL
	NTC1k8		■		01DT-1FL
	NTC10k (10k2)		■		01DT-1LL
	NTC20k	■		01DT-1QL	
	Pt100	150 mm		■	01DT-1AN
	Pt1000			■	01DT-1BN
	Ni1000			■	01DT-1CN
	Ni1000TK5000			■	01DT-1DN
	NTC1k8		■		01DT-1FN
	NTC10k (10k2)		■		01DT-1LN
	NTC10k Pre (10k3)		■		01DT-MN
	NTC10k Carel		■		01DT-1NN
	NTC20k		■		01DT-1QN

# Duct and immersion sensors temperature

## Output signals passive and active

Degree of protection IP65 / NEMA 4X  
 Housing Plastic, with snap-on cover



Measured values

Measuring ranges

Output signals

Temperature

		Multirange	Probe length	-50...50°C	-50...150°C	-50...160°C	-20...80°C	-15...35°C	-10...120°C	0...50°C	0...100°C	0...160°C	0...250°C	Sensor type	
<b>Temperature</b>															
<b>Passive</b>	Pt100		200 mm			■								01DT-1AP	
	Pt1000					■									01DT-1BP
	Ni1000						■								01DT-1CP
	Ni1000TK5000						■								01DT-1DP
	NTC1k8														01DT-1FP
	NTC5k					■									01DT-1HP
	NTC10k (10k2)					■									01DT-1LP
	NTC10kPre (10k3)					■									01DT-1MP
	NTC20k					■									01DT-1QP
	Pt100		300 mm			■								01DT-1AR	
	Pt1000					■									01DT-1BR
	Ni1000						■								01DT-1CR
	Ni1000TK5000						■								01DT-1DR
	NTC1k8					■									01DT-1FR
	NTC10k (10k2)					■									01DT-1LR
	NTC10k Pre (10k3)					■									01DT-MP
	NTC20k					■									01DT-1QR
	Pt100			450 mm				■							
	Pt1000						■								01DT-1BT
	Ni1000						■								01DT-1CT
	Ni1000TK5000						■								01DT-1DT
NTC1k8					■									01DT-1FT	
NTC10k (10k2)					■									01DT-1LT	
NTC20k					■									01DT-1QT	
DC 0...5 V / 0...10 V	■	50 mm			■			■	■	■	■	■	□	■	22DT-12H
4...20 mA	■				■			■	■	■	■	■	□	■	22DT-14H
DC 0...5 V / 0...10 V	■	100 mm		■			■	■	■	■	■	□	■	22DT-12L	
4...20 mA	■			■			■	■	■	■	■	□	■	22DT-14L	
DC 0...5 V / 0...10 V	■	150 mm		■			■	■	■	■	■	□	■	22DT-12N	
4...20 mA	■			■			■	■	■	■	■	□	■	22DT-14N	
DC 0...5 V / 0...10 V	■	200 mm		■			■	■	■	■	■	□	■	22DT-12P	
4...20 mA	■			■			■	■	■	■	■	□	■	22DT-14P	
DC 0...5 V / 0...10 V	■	300 mm		■			■	■	■	■	■	□	■	22DT-12R	
4...20 mA	■			■			■	■	■	■	■	□	■	22DT-14R	
DC 0...5 V / 0...10 V	■	450 mm		■			■	■	■	■	■	□	■	22DT-12T	
4...20 mA	■			■			■	■	■	■	■	□	■	22DT-14T	

□ Factory setting (setting ranges are selectable on the sensor)

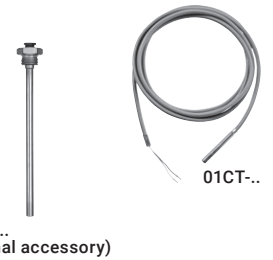
Scope-of-delivery and optional accessories from **page 19**



# Cable sensors for temperature

## Output signals passive and active

Power supply (active sensors only)	DC 15...24 V / AC 24 V
Degree of protection	IP65 / NEMA 4X
Housing	Plastic, with snap-on cover



Measured values		Output signals		Multirange	Cable (2000 mm)	Probe length	Mounting flange included	Measuring ranges								Sensor type			
								Temperature											
								-50...50°C	-35...100°C	-20...80°C	-15...35°C	-10...120°C	0...50°C	0...100°C	0...160°C	0...250°C			
<b>Temperature</b>																			
<b>Passive</b>	Pt100		■			50 mm		■									01CT-1AH		
	Pt1000		■						■									01CT-1BH	
	Ni1000		■						■									01CT-1CH	
	Ni1000TK5000		■						■									01CT-1DH	
	NTC1k8		■						■									01CT-1FH	
	NTC10k (10k2)		■						■									01CT-1LH	
	NTC20k		■					■									01CT-1QH		
	Pt100		■				100 mm	■	■									01CT-1ALF	
	Pt1000		■					■	■										01CT-1BLF
	Ni1000		■					■	■										01CT-1CLF
	Ni1000TK5000		■					■	■										01CT-1DLF
	NTC10k (10k2)		■					■	■										01CT-1LLF
	NTC20k		■					■	■										01CT-1QLF
	Pt100		■				200 mm	■	■									01CT-1APF	
	Pt1000		■					■	■										01CT-1BPF
	Ni1000		■					■	■										01CT-1CPF
Ni1000TK5000		■				■		■										01CT-1DPF	
NTC10k (10k2)		■				■		■										01CT-1LPF	
NTC20k		■				■		■										01CT-1QPF	
<b>Active</b>	DC 0...5 V / 0...10 V	■	■			50 mm		■	■	■	■	■	■	■	□	■	22CT-12H		
	4...20 mA	■	■					■	■	■	■	■	■	■	□	■	22CT-14H		

□ Factory setting (setting ranges are selectable on the sensor)

# Safety temperature limiter STB / Temperature monitor TW

## Output signal switch 1 x SPDT

- Switch contact: 1 x EPU, AC 230 V, 16 A
- Switching value: Control window in the housing cover
- Mounting: Pipeline, thermowell or wall mounting
- Pipe mounting: Fixing strap, included
- Mounting: Spring loaded terminal blocks
- Reset: Manual for safety temperature limiter STB  
Automatic for temperature monitor TW
- Capillary fracture protection: For safety temperature limiter STB



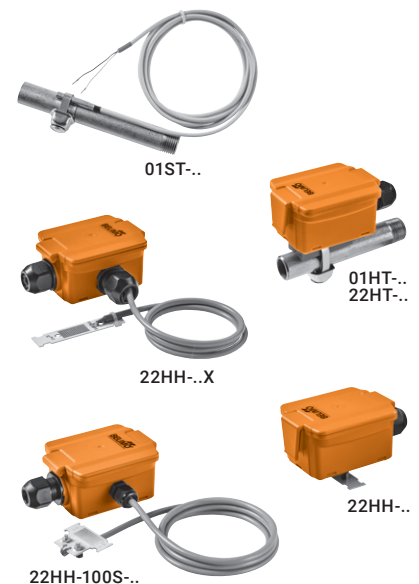
	Measured values		Application				Set point range			Output signals		
	Safety temperature limiter STB	Temperature monitor TW	Hot water	Hot water steam	Fire protection thermostat in the duct	30...90°C	50...80°C	70...130°C	SPDT switch	Sensor type		
Temperature	■		■		■				1			EXT-J-00734645
Switch	■		■	■	■			■	1			EXT-J-00734647
		■				■			1			01HT-101CA

# Contact sensors temperature / condensation

## Output signals active, passive or switch 1 x SPDT

For temperature measurement on pipes and curved surfaces (ST-., HT-. types) or for detection of condensation on chilled surfaces (22HH.. types).

Power supply DC 15...24 V / AC 24 V  
(active sensors only)  
Degree of protection IP65 / NEMA 4X  
Housing Plastic, with snap-on cover



Measured values		Measuring ranges																					
		Temperature																					
Output signals		Multirange	Sensor cable 2 m	Sensor cable 7 m	Sensor cable 12 m	External sensor 75 mm	External sensor 45 mm	LED signalling	-50...50°C	-35...90°C	-35...100°C	-20...80°C	-15...35°C	-10...120°C	0...50°C	0...100°C	0...160°C	0...250°C	Condensation	SPDT switch	Sensor type		
Temperature	Pt100		■								■										01ST-1A3		
	Pt1000		■								■											01ST-1B3	
	Ni1000		■								■											01ST-1C3	
	Ni1000TK5000		■								■											01ST-1D3	
	NTC1k8		■								■											01ST-1F3	
	NTC10k (10k2)		■								■											01ST-1L3	
	NTC20k		■								■											01ST-1Q3	
	Passive	Pt100									■											01HT-1A	
		Pt1000									■												01HT-1B
		Ni1000									■												01HT-1C
		Ni1000TK5000									■												01HT-1D
		NTC1k8									■												01HT-1F
		NTC10k (10k2)									■												01HT-1L
	Active	DC 0...5 V / DC 0...10 V	■							■		■	■	■	■	□	■	■				22HT-12	
4...20 mA		■							■		■	■	■	■	□	■	■					22HT-14	
Condensation								■											■			22HH-10	
			■					■												■		22HH-100X	
				■				■												■	1	22HH-100S-6	
					■			■												■			22HH-100S-7
						■		■												■			

□ Factory setting (setting ranges are selectable on the sensor)

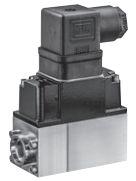
# Pressure and flow sensors

## Output signal active

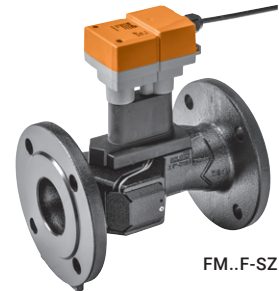
Power supply	DC 15...24 V / AC 24 V (types with voltage outlet) DC 15...24 V (types with current outlet) AC/DC 24 V (FM.. types)
Degree of protection	22WP-../22WDP-...: IP65 / NEMA 4 FM...: IP54 / NEMA 1
Housing	22WP-../22WDP-...: Metal FM...: Plastic
Cable entry	22WP-...: MVS connector plug, in accordance with DIN EN 175301-803 / Type A 22WDP-...: Angular connectors in accordance with DIN 43650, construction A FM...: cable 1 m, 3 x 0.75 mm <sup>2</sup>
Cable gland	PA6, black



22WP-..



22WDP-..



FM..F-SZ



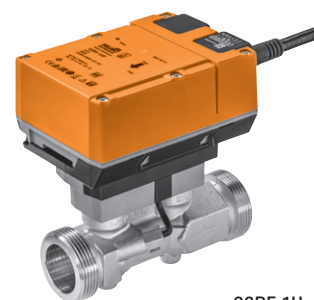
### Measured values

### Output signals

		Water	Refrigerants	Water glycol mixtures (<50 vol.%)	Nominal diameter DN	Flange connection	Thread connection	Measuring ranges						Sensor type		
								Pressure			Flow rate					
								0...1 bar	0...2.5 bar	0...4 bar	0...6 bar	0...10 bar	0...16 bar			
<b>Pressure</b>																
Active	DC 0...10 V	■	■												22WP-114	
		■	■												22WP-115	
		■	■												22WP-116	
	4...20 mA	■	■													22WP-117
		■	■													22WP-134
		■	■													22WP-135
		■	■													22WP-136
		■	■												22WP-137	
<b>Differential pressure</b>																
Active	DC 0...10 V	■													22WDP-111	
		■													22WDP-112	
		■													22WDP-114	
	4...20 mA	■														22WDP-115
		■														22WDP-131
		■														22WDP-132
		■														22WDP-134
															22WDP-135	
<b>Flow</b>																
Active	DC 0.5...10 V	■		■	80	■								0...13.6 l/s	FM080F-SZ	
		■		■	100	■								0...24.0 l/s	FM100F-SZ	
		■		■	125	■									0...37.5 l/s	FM125F-SZ
		■		■	150	■									0...54.0 l/s	FM150F-SZ

# Flow sensors with glycol compensation

**Output signal active, MP-Bus, BACnet MSTP,  
Modbus RTU**



22PF-1U..

For flow measurement in water and water-glycol mixtures. The flow sensor automatically and continuously measures and compensates for the glycol content of the fluid to ensure an accurate measurement every time. Equipped with Near Field Communication (NFC), the flow sensor can be easily commissioned and diagnostics, parametrisation and maintenance can be carried out directly from a smartphone using the Belimo Assistant App.

Power supply	AC/DC 24 V
Degree of protection	IP54
Nominal pressure	PN 25
Connection	Cable 1 m, 6 x 0.75 mm <sup>2</sup>
Analogue output	DC 0...10 V, DC 0.5...10 V, DC 2...10 V (parametrisable with the Belimo Assistant App)
Converter for sensors	Optionally, a sensor can be connected. This can be a passive resistance sensor Pt1000, Ni1000, NTC10k (10k $\Omega$ ), an active sensor with output DC 0...10 V or a switching contact. As a result, the analogue signal of the sensor can be easily digitised with the flow sensor and transferred to the corresponding bus system.
Communication	MP-Bus, BACnet MS/TP, Modbus RTU, NFC
Accumulation	The flow can be accumulated over time.
Parametrisation, diagnostics	Via NFC with the Belimo Assistant App



## Measured values

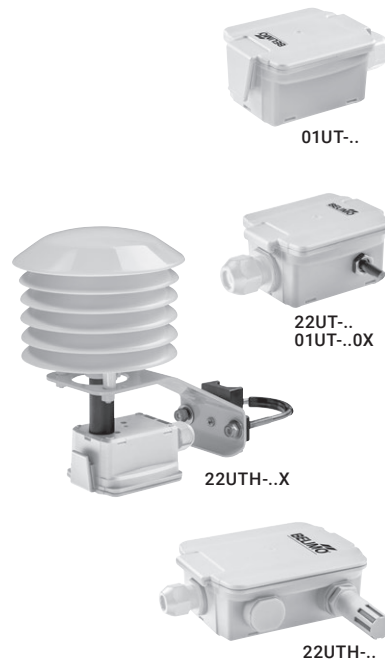
	Nominal diameter DN	External thread G	Installation length	Maximum measurable flow, FS	Water	Water glycol mixtures (<50 vol.%)	Sensor type
<b>Flow (volumetric flow)</b>							
DC 0...10 V DC 0.5...10 V DC 2...10 V	15	3/4"	110 mm	1.8 m <sup>3</sup> /h	■	■	<b>22PF-1UC</b>
	20	1"	130 mm	3 m <sup>3</sup> /h	■	■	<b>22PF-1UD</b>
	25	1 1/4"	135 mm	4.2 m <sup>3</sup> /h	■	■	<b>22PF-1UE</b>
	32	1 1/2"	140 mm	7.2 m <sup>3</sup> /h	■	■	<b>22PF-1UF</b>
	40	2"	145 mm	12 m <sup>3</sup> /h	■	■	<b>22PF-1UG</b>
	50	2 1/2"	145 mm	18 m <sup>3</sup> /h	■	■	<b>22PF-1UH</b>
	50	2 1/2"	145 mm	27.24 m <sup>3</sup> /h	■	■	<b>22PF-1UHH</b>

# Outdoor sensors humidity / temperature

## Output signals active, passive, Modbus RTU, BACnet MS/TP

For measuring temperature or relative humidity and outdoor temperature, as well as in sophisticated indoor applications that require high IP protection, e.g. in warehouses, refrigerated warehouses, greenhouses and production halls.

Power supply	DC 15...24 V / AC 24 V
(active sensors only)	
Degree of protection	IP65 / NEMA 4X
Housing	Plastic, with snap-on cover
Communication	Modbus RTU, BACnet MS/TP



Measured values		Measuring ranges																		
Output signals		Temperature						Humidity												
	External sensor probe (short response time)	Multirange	-50...50°C	-40...60°C	-35...50°C	-35...90°C	-20...80°C	-15...35°C	-10...120°C	0...50°C	0...100°C	0...160°C	0...250°C	Relative: 0...100% RH	Absolute: 0...50 g/m³	Absolute: 0...80 g/m³	Dew point: 0...50°C	Dew point: -20...80°C	Enthalpy: 0...85 kJ/kg	Sensor type
		<b>Temperature</b>																		
Passive	Pt100				■															01UT-1A
	Pt100 ext.	■			■															01UT-1A0X
	Pt1000				■															01UT-1B
	Pt1000 ext.	■			■															01UT-1B0X
	Ni1000				■															01UT-1C
	Ni1000TK5000				■															01UT-1D
	NTC1k8				■															01UT-1F
	NTC10k (10k2)				■															01UT-1L
	NTC10k Carel				■															01UT-1N
	NTC20k				■															01UT-1Q
Active	DC 0...5 V / 0...10 V	■	■	□		■	■	■	■	■	■	■								22UT-12
	4...20 mA	■	■	□		■	■	■	■	■	■	■								22UT-14
<b>Humidity / Temperature</b>																				
Active	DC 0...5 V / 0...10 V		■	■		□	■	■					□	■	■	■	■	■	■	22UTH-11
	4...20 mA		■	■		□	■	■					□	■	■	■	■	■	■	22UTH-13
	DC 0...5 V / 0...10 V		■	■		□	■	■					□	■	■	■	■	■	■	22UTH-110X
	4...20 mA		■	■		□	■	■					□	■	■	■	■	■	■	22UTH-130X
	Modbus RTU					□								□	□	□	□	□	□	22UTH-150X
	BACnet MS/TP					□								□	□	□	□	□	□	22UTH-160X

□ Factory setting (setting ranges are selectable on the sensor)  
Further settings and live data can be selected and read out via Bluetooth with the accessory A-22G-A05 (22UTH-150X, 22UTH-160X).







# Room sensors / Room operating units

## Output signals active, passive and MP-Bus®

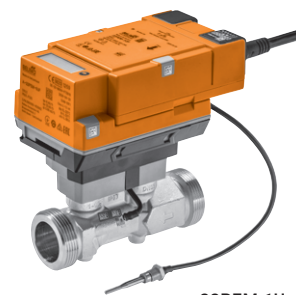
Parametrisation Deenergised via NFC  
 Diagnostics function Simple via NFC  
 Output signals 0...5 V, 0...10 V, 2...10 V, 4-20mA, MP-Bus, BACnet, Modbus available  
 Ambient conditions 0...50°C, 5...95% RH



	Type code	Modbus/BACnet	Measured values					Measuring ranges			Display / NFC		
			CO <sub>2</sub>	Relative humidity	Absolute humidity	Temperature active	Temperature passive	CO <sub>2</sub> (ppm)	Humidity	Temperature	ePaper display	Display App	NFC
	01RT					■	-	-	0...50 °C	-	-	-	
	P-01RT					■	-	-	0...50 °C	-	-	-	
	P-22RT-1800D-1					■	-	-	0...50 °C	■	■	■	
	P-22RTH-1800D-1			■	■	■	-	0...100%	0...50 °C	■	■	■	
	P-22RTM-1800D-1		■	■	■	■	0...2000	0...100%	0...50 °C	■	■	■	
	22RTH-5800D			■	■	■	-	0...100%	0...50 °C	■	■	■	
	22RTM-5800D		■	■	■	■	0...2000	0...100%	0...50 °C	■	■	■	
	P-22RTH-1U00D-2	■		■	■	■	0...2000	0...100%	0...50 °C	■	■	■	
	P-22RTM-1U00D-2	■	■	■	■	■	0...2000	0...100%	0...50 °C	■	■	■	
	P-22RT-18-1					■	-	-	0...50 °C	-	■	■	
	P-22RTH-18-1			■	■	■	-	0...100%	0...50 °C	-	■	■	
	P-22RTM-18-1		■	■	■	■	0...2000	0...100%	0...50 °C	-	■	■	
	22RTH-5800A			■	■	■	-	0...100%	0...50 °C	-	■	■	
	22RTM-5800A		■	■	■	■	0...2000	0...100%	0...50 °C	-	■	■	
	P-22RTH-1U00A-2	■		■	■	■	0...2000	0...100%	0...50 °C	-	■	■	
	P-22RTM-1U00A-2	■	■	■	■	■	0...2000	0...100%	0...50 °C	-	■	■	

# Thermal Energy Meters according to EN 1434 with MID approval

## Communication via MP-Bus<sup>®</sup>, Modbus, BACnet, M-Bus (with converter)



22PEM-1U..

For measuring thermal energy. For invoicing, they provide reliable data that can be used for direct billing. Thermal Energy Meters can be operated as heat meters, cooling meters or heat/cooling meters. In addition, they can be installed either in the return or in the supply of the system. Thermal Energy Meters meet the requirements according to EN 1434 and have a type approval according to the European Measuring Instruments Directive 2014/32/EU (MI-004) as heat meters.

Power supply	AC/DC 24 V or PoE (Power over Ethernet)
Degree of protection	IP54
Nominal pressure	PN 25
Connection	Cable 1 m, 6 x 0.75 mm <sup>2</sup> and RJ45 connector socket
Analogue output	Selectable as DC 0...10 V, DC 0.5...10 V or DC 2...10 V. E.g. the flow or the temperature of the temperature sensor T1/T2 can be output.
Converter for sensors	Optionally, a sensor can be connected. This can be a passive resistance sensor Pt1000, Ni1000, NTC10k (10k2), an active sensor with output DC 0...10 V or a switching contact. In this way, the analogue signal of the sensor can be easily digitised with the Thermal Energy Meter and transferred to the corresponding bus system.
Thermal energy display	Via LCD display and via communication
Communication	MP-Bus, Modbus RTU, Modbus TCP, BACnet MS/TP, BACnet IP, M-Bus (with converter G-22PEM-A01), NFC
Parametrisation, diagnostics	Via integrated web server and with Belimo Assistant App via NFC

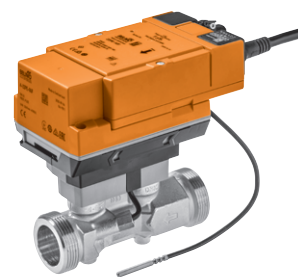


### Measured values

	Nominal diameter DN	External thread G	Installation length	Nominal flow qp	Maximum flow qs	Pressure drop Δp@qp	Water	Sensor type
<b>Thermal energy, flow, temperature</b>								
DC 0...10 V DC 0.5...10 V DC 2...10 V	15	3/4"	110 mm	1.5 m <sup>3</sup> /h	3 m <sup>3</sup> /h	15 kPa	■	22PEM-1UC
	20	1"	130 mm	2.5 m <sup>3</sup> /h	5 m <sup>3</sup> /h	12 kPa	■	22PEM-1UD
	25	1 1/4"	135 mm	3.5 m <sup>3</sup> /h	7 m <sup>3</sup> /h	7 kPa	■	22PEM-1UE
	32	1 1/2"	140 mm	6 m <sup>3</sup> /h	12 m <sup>3</sup> /h	14 kPa	■	22PEM-1UF
	40	2"	145 mm	10 m <sup>3</sup> /h	20 m <sup>3</sup> /h	18 kPa	■	22PEM-1UG
	50	2 1/2"	145 mm	15 m <sup>3</sup> /h	30 m <sup>3</sup> /h	22 kPa	■	22PEM-1UH

# Thermal Energy Meters with glycol compensation

## Communication via MP-Bus<sup>®</sup>, Modbus, BACnet, M-Bus (with converter)



22PE-1U..

For accurate measurement of thermal energy, even if there is glycol in the water circuit. They automatically and continuously measure the glycol content in the fluid, compensate for it, and thereby ensure reliable volumetric flow measurement. Based on this, the thermal energy can be determined exactly. Thermal Energy Meters can be operated as heat meters, cooling meters or heat/cooling meters. In addition, they can be installed either in the return or in the supply of the system.

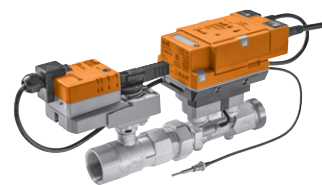
Power supply	AC/DC 24 V or PoE (Power over Ethernet)
Degree of protection	IP54
Nominal pressure	PN 25
Connection	Cable 1 m, 6 x 0.75 mm <sup>2</sup> and RJ45 connector socket
Analogue output	Selectable as DC 0...10 V, DC 0.5...10 V or DC 2...10 V. E.g. the flow or the temperature of the temperature sensor T1/T2 can be output.
Converter for sensors	Optionally, a sensor can be connected. This can be a passive resistance sensor Pt1000, Ni1000, NTC10k (10k2), an active sensor with output DC 0...10 V or a switching contact. In this way, the analogue signal of the sensor can be easily digitised with the Thermal Energy Meter and transferred to the corresponding bus system.
Thermal energy display	Via communication
Communication	MP-Bus, Modbus RTU, Modbus TCP, BACnet MS/TP, BACnet IP, M-Bus (with converter G-22PEM-A01), NFC
Parametrisation, diagnostics	Via integrated web server and with Belimo Assistant App via NFC



### Measured values

	Nominal diameter DN	External thread G	Installation length	Nominal flow qp	Maximum flow qs	Pressure drop Δp@qp	Water	Water glycol mixtures (<50 vol.%)	Sensor type
<b>Thermal energy, flow, temperature</b>	15	3/4"	110 mm	1.5 m <sup>3</sup> /h	3 m <sup>3</sup> /h	15 kPa	■	■	<b>22PE-1UC</b>
	20	1"	130 mm	2.5 m <sup>3</sup> /h	5 m <sup>3</sup> /h	12 kPa	■	■	<b>22PE-1UD</b>
	25	1 1/4"	135 mm	3.5 m <sup>3</sup> /h	7 m <sup>3</sup> /h	7 kPa	■	■	<b>22PE-1UE</b>
	32	1 1/2"	140 mm	6 m <sup>3</sup> /h	12 m <sup>3</sup> /h	14 kPa	■	■	<b>22PE-1UF</b>
	40	2"	145 mm	10 m <sup>3</sup> /h	20 m <sup>3</sup> /h	18 kPa	■	■	<b>22PE-1UG</b>
	50	2 1/2"	145 mm	15 m <sup>3</sup> /h	30 m <sup>3</sup> /h	22 kPa	■	■	<b>22PE-1UH</b>
	50	2 1/2"	145 mm	22.7 m <sup>3</sup> /h	30 m <sup>3</sup> /h	22 kPa	■	■	<b>22PE-1UHH</b>

# Belimo Energy Valve™ according to EN 1434 with MID approval



Range of use	Closed water circuit (pH >7)
Fluid temperature	-10...120°C (-10...2°C valve neck extension or spindle heater recommended)
Medium temperature note	MID certified 15...120°C
Pipe connection	Internal thread Rp (ISO 7-1) and external thread G (ISO 228-1)
Leakage rate	Air-bubble tight, leakage rate A (EN 12266-1)
Permissible operating pressure	ps: 1600 kPa
V <sub>max</sub>	Freely adjustable 25...100% of V <sub>nom</sub>

Thermal Energy Meters meet the requirements of EN 1434 and have type approval according to the European Measuring Instruments Directive 2014/32/EU (MI-004) as heat meters.

Completely parametrizable by means of integrated web server or Belimo Assistant App



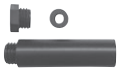

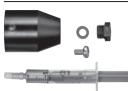
Optional connection to the Belimo Cloud

Sensor-operated flow or power control





PN	DN	G	Rp	V <sub>nom</sub> [l/s]	V <sub>nom</sub> [l/min]	V <sub>nom</sub> [m <sup>3</sup> /h]	qp [m <sup>3</sup> /h]	Nominal voltage AC/DC 24 V	Modulating (2...10 V, variable)	MP-Bus communication	Modbus communication	BACnet communication	Valve type with actuator
<b>With standard actuator</b>													
25	15	3/4"	1/2"	0.42	25	1.5	1.5	24 V	■	■	■	■	EV015R2+MID
	20	1"	3/4"	0.69	41.7	2.5	2.5		■	■	■	■	EV020R2+MID
	25	1 1/4"	1"	0.97	58.3	3.5	3.5		■	■	■	■	EV025R2+MID
	32	1 1/2"	1 1/4"	1.67	100	6	6		■	■	■	■	EV032R2+MID
	40	2"	1 1/2"	2.78	166.7	10	10		■	■	■	■	EV040R2+MID
	50	2 1/2"	2"	4.17	250	15	15		■	■	■	■	EV050R2+MID





## Thermowells and compression fittings

		Sleeve length	Suitable for sensor										Type				
			01DT...H	01DT...L	01DT...N	01DT...P	01DT...R	01DT...T	22DT...H	22DT...L	22DT...N	22DT...P		22DT...R	22DT...T		
	<b>Thermowell</b> Stainless steel, G1/2", SW27	50 mm	■							■							A-22P-A06
		100 mm		■								■					A-22P-A08
		150 mm			■								■				A-22P-A10
		200 mm				■								■			A-22P-A12
		300 mm					■								■		A-22P-A14
		450 mm						■								■	A-22P-A16
	<b>Thermowell</b> Brass R 1/2", SW22	50 mm	■								■						A-22P-A18
		100 mm		■								■					A-22P-A20
		150 mm			■								■				A-22P-A22
		200 mm				■								■			A-22P-A24
		300 mm					■								■		A-22P-A26
	450 mm						■								■	A-22P-A28	
	<b>Cold barrier</b> Plastic L 50 mm For thermowell A-22P-A..				■	■	■	■	■		■	■	■	■	■	■	A-22P-A51
	<b>Compression fittings</b> Stainless steel G 1/4" (external thread) for 6 mm With cutting ring		■	■	■	■	■	■	■	■	■	■	■	■	■	■	A-22P-A45
	<b>Adapter for Siemens thermowell</b> Plastic For thermal contact fluid				■	■											A-22P-A53

## Thermowell kits




		Sleeve length	Suitable for sensor			Type
			01HT-101CA	EXT-J-00734645	EXT-J-00734647	
	<b>Thermowell kits</b> Brass nickel-plated For sensor probe 6 mm Incl. probe fastening material G 1/2", SW22	100 mm	■	■	■	A-22P-A61
		150 mm	■	■	■	A-22P-A62
		200 mm	■	■	■	A-22P-A63
	<b>Thermowell kits</b> Stainless steel For sensor probe 6 mm Incl. probe fastening material G 1/2", SW22	100 mm	■	■	■	A-22P-A64
		150 mm	■	■	■	A-22P-A65
		200 mm	■	■	■	A-22P-A66

## Mounting flanges

		Suitable for sensor																								
		Ø	01CT..	01CT..F	01DT..H	01DT..L	01DT..N	01DT..P	01DT..R	01DT..T	20DTS..	22DC..	22DCK..	22DCM..	22DCV..	22DT..	22DT..H	22DT..L	22DT..N	22DT..P	22DT..R	22DT..T	22DTC..	22DTH..	22DTM..	Type
	<b>Mounting flange</b> Plastic For sensor probe 6 mm Up to max. 120°C	4...7 mm	■	□	■	■	■	■	■	■							■	■	■	■	■	■				A-22D-A03
	<b>Mounting flange</b> Brass For sensor probe 6 mm Up to max. 260°C	6 mm			■	■	■	■	■								■	■	■	■	■	■				A-22D-A05
	<b>Mounting flange</b> Plastic For frost monitor 20DTS..										■															A-22D-A12
	<b>Mounting flange</b> Plastic For duct sensors 19.5 mm Up to max. 120°C	20 mm										□	□	□	□								□	□	□	A-22D-A35

□ Accessories included in scope of delivery at the factory


## Adapters and pipe fitting kits

		Suitable for sensor			
		Ø	22WDP..	22WP..	Type
	<b>Reducer adapter</b> G 1/4" (internal thread) to G 1/2" (external thread)			■	A-22WP-A02
	<b>Pipe connector</b> Stainless steel Pipe 6 and 8 mm to G 1/4" (external thread) Multipack 2 pcs.	6 mm	■		A-22WP-A06
		8 mm	■		A-22WP-A10
	<b>Pipe connector</b> Brass Pipe 6 and 8 mm to G 1/4" (external thread) Multipack 2 pcs.	6 mm	■		A-22WP-A04
		8 mm	■		A-22WP-A08










## Parametrisation accessories

		Suitable for sensor																
		22RT..	P-22RT..	22PEM..	22PE..	22PF..	22ADP..	22DTH-15..	22DTH-16	22DC-13	22DTC..	22DTM..	22DCV-11..	22DCM-11	22DCK-11	22UTH-150X	22UTH-160X	Type
	<b>Bluetooth / NFC converter</b> For temporary, wireless operation of Belimo devices with an NFC interface. Works with the Belimo Assistant App.	■	■	■	■	■												ZIP-BT-NFC



## Accessories for air differential pressure sensors

		Suitable for sensor			
		Length	01APS..	22ADP..	Type
	<b>Duct connection elements</b> Metal Hose connection 5 mm	40 mm	■	■	A-22AP-A02
	<b>Duct connection elements</b> Metal Hose connection 5 mm	100 mm	■	■	A-22AP-A04
	<b>Duct connection elements</b> Plastic Hose connection 6 mm Multipack 90 pcs.	80 mm	■		A-22AP-A09.1
	<b>Duct connection kit</b> For 22ADP.. PVC tube 2 m 2 plastic connection elements	2000 mm	■	□	A-22AP-A08 <sup>1)</sup>
	<b>Duct connection kit</b> For 01APS.. PVC tube 2 m 2 plastic connection elements Multipack 50 pcs.	2000 mm	□		A-22AP-A05.1 <sup>1)</sup>




□ Accessories included in scope of delivery at the factory

<sup>1)</sup> Price shown is per set.

## Accessories for humidity sensors




		Suitable for sensor		
		22UTH-..	22DTH-..	Type
	<b>Replacement filter</b> Stainless steel Wire mesh	■	■	A-22D-A06
	<b>Rain cover</b> For 22UTH-11 and 22UTH-13	■		A-22U-A01

## Fixing straps and thermal contact fluid



		Suitable for sensor					
		01ST-..	01HT-..	22HT-..	22HH-..	22HH-..X	Type
	<b>Fixing strap</b> For pipes up to Ø 40...110 mm	□	□	□			A-22P-A47
	<b>Fixing strap</b> For pipes up to Ø 40...250 mm	■	■	■			A-22P-A49
	<b>Syringe with thermal contact fluid</b>	■	■	■	□	□	A-22P-A44

□ Accessories included in scope of delivery at the factory



## Connection adapters

		Suitable for sensor																					
		01DT-..	22DT-..	01PT-..	01MT-..	22MT-..	22CT-..	01HT-..	22HT-..	01UT-..	22UT-..	22UTH-..	22HH-..	22DTH-..	22DC-..	22DTC-..	22DTM-..	22DCK-..	22DCM-..	22DCV-..	22ADP-..	01APS-..	Type
	<b>Connection adapter M20</b> For cable 1 x 6 mm Multipack 10 pcs.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		A-22G-A01.1
	<b>Connection adapter M20</b> For cable 2 x 6 mm Multipack 10 pcs.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		A-22G-A02.1
	<b>Cable entry M20x1.5</b> Multipack 10 pcs.																					■	A-22AP-A11.1


## Pipe connectors

	DN	G	Rp	Suitable for Thermal Energy Meter		Suitable for valve	Type
				22PE-1U..	22PF-1U..	EY..R2+MID	
 <b>Pipe connector</b> For ball valve with internal thread Brass nickel-plated	15		1/2"			■	ZR2315
	20		3/4"			■	ZR2320
	25		1"			■	ZR2325
	32		1 1/4"			■	ZR2332
	40		1 1/2"			■	ZR2340
	50		2"			■	ZR2350
 <b>Pipe connector</b> Set of 2 pcs. Brass nickel-plated	15	3/4"	1/2"	■	■	■	EXT-EF-15D
	20	1"	3/4"	■	■	■	EXT-EF-20D
	25	1 1/4"	1"	■	■	■	EXT-EF-25D
	32	1 1/2"	1 1/4"	■	■	■	EXT-EF-32D
	40	2"	1 1/2"	■	■	■	EXT-EF-40D
	50	2 1/2"	2"	■	■	■	EXT-EF-50D

## Insulation shells



	DN	2-way	Suitable for Thermal Energy Meter		Suitable for valve	Type
			22PE..	22PF..	EY..R2+MID	
 <b>Insulation shells for Belimo Energy Valve™</b> Only for non-condensing applications included in scope of delivery	15...25	■			■	Z-INSH15
	32...50	■			■	Z-INSH32
 <b>Insulation shell for Thermal Energy Meters and flow sensors</b> Only for non-condensing applications included in scope of delivery	15...25	■	■	■		A-22PEM-A01
	32...50	■	■	■		A-22PEM-A02

## T-pieces with thermowell

	DN	Rp	Suitable for Thermal Energy Meter		Type
			22PE-1U..		
 <b>T-pieces with thermowell</b> For installation of external temperature sensor T1	15	1/2"	■		A-22PE-A01
	20	3/4"	■		A-22PE-A02
	25	1"	■		A-22PE-A03
	32	1 1/4"	■		A-22PE-A04
	40	1 1/2"	■		A-22PE-A05
	50	2"	■		A-22PE-A06

## Thermowells




Suitable for  
Thermal Energy Meter

		DN	G	22PE-1U.	Type
	<b>Thermowells</b> For installation of external temperature sensor T1	15...50	1/4"	■	<b>A-22PE-A07</b>
		65...100	1/2"	■	<b>A-22PE-A08</b>

## MID accessory kits

Suitable for  
Thermal Energy  
Meter



Suitable for  
valve

		DN	G	Rp	Fitting piece length	22PEM-1U.	EV..R2+MID	Type
	<b>MID accessory kit without fitting piece</b> Consists of open/close valve (2x) and temperature measurement ball valve for sensor installation, directly immersed	15	3/4"	1/2"		■		<b>EXT-EF-15A</b>
		20	1"	3/4"		■		<b>EXT-EF-20A</b>
		25	1 1/4"	1"		■		<b>EXT-EF-25A</b>
		32	1 1/2"	1 1/4"		■		<b>EXT-EF-32A</b>
		40	2"	1 1/2"		■		<b>EXT-EF-40A</b>
		50	2 1/2"	2"		■		<b>EXT-EF-50A</b>
	<b>MID accessory kit with fitting piece</b> Consists of open/close valve (2x) and temperature measurement ball valve for sensor installation, directly immersed	15	3/4"	1/2"	110 mm	■		<b>EXT-EF-15B</b>
		20	1"	3/4"	130 mm	■		<b>EXT-EF-20B</b>
		25	1 1/4"	1"	135 mm	■		<b>EXT-EF-25B</b>
		32	1 1/2"	1 1/4"	140 mm	■		<b>EXT-EF-32B</b>
		40	2"	1 1/2"	145 mm	■		<b>EXT-EF-40B</b>
		50	2 1/2"	2"	145 mm	■		<b>EXT-EF-50B</b>
	<b>MID accessory kit Belimo Energy Valve™</b> Consists of open/close valve and temperature measurement ball valve for sensor installation, directly immersed	15	3/4"	1/2"			■	<b>EXT-EF-15C</b>
		20	1"	3/4"			■	<b>EXT-EF-20C</b>
		25	1 1/4"	1"			■	<b>EXT-EF-25C</b>
		32	1 1/2"	1 1/4"			■	<b>EXT-EF-32C</b>
		40	2"	1 1/2"			■	<b>EXT-EF-40C</b>
		50	2 1/2"	2"			■	<b>EXT-EF-50C</b>



## Thermal Energy Meter accessories

Suitable for  
Thermal Energy Meter

Suitable for  
valve


		22PE-1U.	22PEM-1U.	EV..R2+MID	Type
	<b>Security seal</b> Consecutively numbered (once) with attached wire Set of 2 pcs.		■	■	<b>A-22PEM-A03</b>
	<b>Silicone grommet with clamp</b> IP54 protection for RJ connector plug	■	■	■	<b>A-22PEM-A04</b>

## Sensor module as spare part


	DN	Suitable for Thermal Energy Meter		Suitable for valve	Type
		22PE-1U..	22PEM-1U..	EV..R2+MID	
 <b>Sensor module MID</b> Spare part for Thermal Energy Meter with MID approval Incl. 2 security seals and 1 seal	15		■	■	R-22PEM-0UC
	20		■	■	R-22PEM-0UD
	25		■	■	R-22PEM-0UE
	32		■	■	R-22PEM-0UF
	40		■	■	R-22PEM-0UG
	50		■	■	R-22PEM-0UH
 <b>Sensor module</b> Spare part for Thermal Energy Meter without MID approval	15	■			R-22PE-0UC
	20	■			R-22PE-0UD
	25	■			R-22PE-0UE
	32	■			R-22PE-0UF
	40	■			R-22PE-0UG
	50	■			R-22PE-0UH

<sup>1)</sup> Price on request

## Converter for M-Bus

	Suitable for Thermal Energy Meter		Suitable for valve	Type
	22PE-1U..	22PEM-1U..	EV..R2+MID	
 <b>Converter for M-Bus</b> For M-Bus applications	■	■	■	G-22PEM-A01

## Smartphone app







**Belimo Assistant App**  
 Settings and rapid diagnostics for Belimo devices with an NFC interface even in a deenergised state.

**NFC**


For NFC-capable Android smartphones or with ZIP-BT-NFC for Bluetooth connection.

Download from

---



**Bluetooth / NFC converter**  
 For temporary, wireless operation of Belimo devices with an NFC interface, e.g. with the Belimo Assistant App.

Type

**ZIP-BT-NFC**





# All inclusive.

Belimo as a global market leader develops innovative solutions for the controlling of heating, ventilation and air-conditioning systems. Actuators, valves and sensors represent our core business.

Always focusing on customer added value, we deliver more than only products. We offer you the complete product range for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a five-year warranty. Our worldwide representatives in over 80 countries guarantee short delivery times and comprehensive support through the entire product life. Belimo does indeed include everything.

The "small" Belimo devices have a big impact on comfort, energy efficiency, safety, installation and maintenance. In short: Small devices, big impact.



5-year warranty



On site around the globe



Complete product range



Tested quality



Short delivery times



Comprehensive support